Applicant: Anthony O. Banal et al.
Serial No.: 10/013,101
Docket No.: 10249US01
Title: MULTI-CAVITY OPTICAL DISC MOLD

REMARKS

This Amendment is responsive to the Final Office Action mailed October 23, 2003, in which claims 1-8 and 10-15 were rejected, claims 9 and 16 were objected to, and claims 17-20 were allowed. With this Amendment, claim 1 has been amended. Claims 1-20 remain pending in the application and are presented for reconsideration and allowance.

Claim Rejections under 35 U.S.C. § 103

Claims 1, 2, 10, 11, and 15 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Han (U.S. Patent No. 5,914,136) in view of Hamada et al. (U.S. Patent No. 5,356,283). Han is said to disclose a multiple cavity injection molding system. Referring to Figs. 3-5, Han is said to disclose a system comprising multiple single cavity injection molds. Each single cavity injection mold is said to have a first mating portion 60 and a second mating portion 70 which are movable between a closed position in which a mold cavity 44 is formed and an opened position in which the mold product is removed from the cavity. Further, Han is said to disclose the first and second mating portions of each single cavity injection mold are all capable of moving independently from each other (referencing Fig. 4). The mating portions of Han are said to independently center themselves upon movement to the mold closed position. The molding system of Han is further said to have a resin delivery system 42, which is operatively coupled to the first mating portion. Han is acknowledged as failing to disclose the apparatus comprising an ejector system. Hamada et al. is cited as disclosing an injection molding system. The Examiner finds it would have been obvious to one of ordinary skill in the art to have modified the apparatus of Han, as said to have provided the mold within an ejector system.

The Examiner's rejection is respectfully traversed. Independent claim 1 claims a multiple cavity injection molding system comprising at least two **single cavity injection molds** for forming objects. Each single cavity injection mold has a first mating portion and a second mating portion which are movable between a closed position in which a mold cavity is formed by the first and second mating portions, and an opened position in which the object is removed from the mold cavity. The first mating portions and second mating portions of each single cavity injection mold are all capable of moving independently from each other. A resin delivery system is operatively coupled to the first mating portion of each of the at least two single cavity injection

molds for delivering resin into each of the single cavity injection molds. An ejector system is operatively coupled to the second mating portion of the at least two single cavity injection molds projecting the object from the mold cavity.

Contrary to the Examiner's assertions, the invention of independent claim 1 is not made obvious by the combination of Han and Hamada et al. First, the Examiner has erred in his characterization of Han. In particular, Han does not disclose a system comprising multiple **single cavity** injection molds, as asserted by the Examiner. The Examiner has referred to Fig. 4 as showing one single cavity injection mold to the left of runner block 42 and another single cavity injection mold to the right of runner block 42. However, as clearly set forth in Han, Figs. 3 and 4 are a front section and a side section of a forming apparatus according to Han (Column 2, Lines 59-61). As stated at Column 2, Lines 12-16, the upper and lower cavity blocks 30, 40 of Han are formed with a plurality of cavities 44. It can be clearly understood by looking at both Figs. 3 and 4 of Han that **lower block 40 includes a plurality of cavities**, while the upper block 30 is comprised of a plurality of individual cavity blocks 50. Thus, **Han discloses multiple-cavity molds**, and does not disclose at least two single cavity injection molds as claimed in the present application.

Because lower cavity block 40 includes a plurality of cavities 44 (i.e., block 40 is a multi-cavity mold), it is not possible for Han to disclose that the first and second mating portions of each single cavity injection mold are all capable of moving independently from each other. Specifically, in Han all of the cavities 44 within lower block 40 must move together, and are not capable of moving independently from each other, as claimed in the present application. Further, the mating cavity blocks 30/50 and 40 do not work to independently center themselves upon movement into a closed mold position. The Examiner has referred to pressing members 60, 70 which interact to press the end side of the substrate 100 and smoothly trim the substrate of 100. However, the interaction of pressing portions 60, 70 do not in any way act to center the mating portions 30/50 and 40 that define cavities 44.

Combining Han and Hamada et al. does not remedy the noted deficiencies of Han to arrive at the invention of independent claim 1. Specifically, Hamada also discloses a multi-cavity mold, as can be seen from examination of Figs. 1 and 2 of Hamada et al. Combining the ejector system of Hamada et al. with the apparatus of Han still would not result in a molding

system having at least two single cavity injection molds for forming objects, as is claimed in independent claim 1.

Finally, in Paragraph 8 of the Office Action, the Examiner has addressed Applicants earlier assertions that claim 1 should be allowable for the same reasons as claim 17. The Examiner has pointed out in Paragraph 8, that with respect to claim 17, the disclosure of the application clearly designates "cavity side" and "core side" as meaning a structure including the mold cavity. The Examiner further points out that, with respect to claim 1, the "first mating portion and second mating portion" may be broadly construed and are not clearly designated as including molding cavities. In sum, the Examiner finds that claim 1 does not positively require that the mating portions themselves form the mold cavities. Accordingly, claim 1 has been amended to clarify that a mold cavity is formed by the first and second mating portions. With this amendment, Applicants respectfully submit that claim 1 now positively requires the mating portions themselves to form the mold cavities. With such amendment, it is respectfully submitted that none of the references, either alone or in combination with each other, teach the injection molding system in which a mold cavity is formed by the first and second mating portions, and wherein the first mating portions and second mating portions of each single cavity injection mold are all capable of moving independently from each other.

For at least the reasons provided above, independent claim 1 is not obvious over the combination of Han and Hamada et al., and withdrawal of the rejection of amended independent claim 1 under 35 U.S.C. §103(a) is respectfully requested.

Claims 2, 10, 11, and 15 are directly or indirectly dependent upon independent claim 1. As discussed above, amended independent claim 1 is now in condition for allowance. Therefore, withdrawal of the rejection of dependent claims 2, 10, 11, and 15 under 35 U.S.C. §103(a) is also requested.

Claims 3, 4, 6-8, and 12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of Han and Hamada et al. as applied to claims 1, 2, 10, 11, and 15 above, and further in view of Gellert (U.S. Patent No. 4,891,001). Han and Hamada et al. are said to disclose the apparatus as described above. However, Han and Hamada et al. are acknowledged as failing to disclose the apparatus comprising a hot runner manifold, or the injection molds separated from each other by a material having a low thermal conductivity such as air. The

Examiner cites Gellert as disclosing an injection molding apparatus provided with a hot runner manifold 24 for delivering the molding material to plural mold cavities in a molten state. The manifold of Gellert is said to be separated from the mold by insulative spaces 54 in which air is circulated. The Examiner finds it would have been obvious to one of ordinary skill in the art to modify the apparatus of Han and Hamada et al. as such to have provided the apparatus with a hot runner manifold separated from the molds by insulative air spaces, because such a manifold allows for the molding material to reach the cavities in a molten state as suggested by Gellert. The Examiner further finds that by placing the hot runner manifold of Gellert into the apparatus configuration disclosed by Han and Hamada et al., the injection molds will be separated by the air coolant spaces of the manifold.

The Examiner's rejection is respectfully traversed. Claims 3, 4, 6-8, and 12 each depend directly or indirectly from independent claim 1. As discussed above, independent claim 1 is not obvious in view of the combination of Han and Hamada et al. Because claim 1 is not obvious and patentable over the combination of Han and Hamada et al., claims 3, 4, 6-8, and 12 are also not obvious over the combination of Han, Hamada et al. and Gellert. Therefore, withdrawal of the rejection of dependent claims 3, 4, 6-8 and 12 under 35 U.S.C. §103(a) is respectfully requested.

Claim 5 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Han, Hamada et al., and Gellert as applied to claims 1-4, 6-8, 10-12, and 15 above, and further in view of Miyazawa et al. (U.S. patent no. 5,232,710). Han, Hamada et al. and Gellert are said to disclose the apparatus as described above, but do not disclose an insulative ceramic material to be between the single cavity injection molds. Miyazawa et al. is said in this teaching that the equivalent insulative properties of air and ceramics are known in the injection molding art. The Examiner thus finds it would have been obvious to one of ordinary skill in the art to have modified the apparatus of Han, Hamada et al. and Gellert as such to have used a ceramic between the molds as opposed to air, because ceramics are known in the art as an equivalent insulator to air as suggested by Miyazawa et al.

The Examiner's rejection is respectfully traversed. As discussed above, independent 1 (from which claim 5 indirectly depends) is not obvious over the combination of Han and Hamada et al. or the further combination of those references with Gellert. Because claim 1 is not

obvious over these combinations of references, neither is claim 5 made obvious by the combination of Han, Hamada et al., Gellert, and Miyazawa et al. Therefore, withdrawal of the rejection of dependent claim 5 under 35 U.S.C. §103(a) is respectfully requested.

Claims 13 and 14 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Han as modified by Hamada et al. and applied to claims 1, 2, 10, 11 and 15 above, and further in view of Steil et al. (U.S. Patent No. 6,368,542). Han and Hamada et al. are said to disclose the apparatus as described but do not disclose the first mating portion of the injection molds to be resiliently coupled to the resin delivery system by the use of Belleville washers. Steil et al. is cited as disclosing an injection molding apparatus comprising a mold block 12 and a resin delivery system 18, where the mold block is resiliently coupled to the resin delivery system by the use of Belleville washers 68. The Examiner finds it would have been obvious to one of ordinary skill in the art to have modified the apparatus of Han and Hamada et al. as such to have resiliently coupled the molding portions (and thus the mating portions) of the injection molds to the resin delivery system using Belleville washers because this would have allowed for the thermal expansion of the resin delivery system as suggested by Steil et al.

The Examiner's rejection is respectfully traversed. Dependent claims 13 and 14 depend either directly or indirectly from independent claim 1. As discussed above, independent claim 1 is not obvious over the combination of Han and Hamada et al. Because claim 1 is not obvious over the combination of Han and Hamada et al., neither are claims 13 and 14 made obvious by the combination of Han, Hamada et al., and Steil et al. Therefore, withdrawal of the rejection of dependent claims 13 and 14 under 35 U.S.C. §103(a) is respectfully requested.

Allowable Subject Matter

Claims 9 and 16 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 9 and 16 depend indirectly from independent claim 1, which is allowable for the reasons discussed above. Accordingly, dependent claims 9 and 16 are also believed to be in allowable condition as presently written, and Applicants respectfully decline to rewrite dependent claims 9 and 16 in independent form at this time.

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Claims 17-20 were indicated to be allowed. Applicants respectfully acknowledge Examiner's allowance of claims 17-20.

CONCLUSION

It is believed that all claims of the application are now in condition for allowance. Notice to that effect is respectfully requested.

No fees are required under 37 C.F.R. 1.16(b)(c). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 09-0069.

The Examiner is invited to contact the Applicants' Representative at the below-listed telephone number if there are any questions regarding this response.

Respectfully submitted,

Date: 12/19/3

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